Emerging Trends in Sustainable Furniture Design: An Experimental Study on Arabic Calligraphy

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This study investigates the relation between Arabic script and furniture design, as well as their common characteristics. Through experimental modeling, it also verifies the possibility of adapting those uniquely similar qualities to create a special style of flexible, sustainable furniture. This research is mainly interested in the formulation of new guidelines for a special style of flexible, sustainable furniture. This study reviews the literature to identify and classify various methods of using Arabic calligraphy in furniture design, as well as sustainable issues and solutions in furniture design and manufacturing. Experimental three-dimensional modeling software is used to simulate the possibility of adapting Arabic calligraphy to the design of flexible, sustainable furniture.

Keywords: Sustainable furniture, flexible furniture, Arabic calligraphy

1. Introduction

Arabic calligraphy is the artistic practice of handwriting based on the Arabic language and alphabet in countries sharing a common Islamic cultural heritage. It is known in Arabic as khatt (خط), which derives from the word line, design, or construction[1]. Arabic calligraphy is highly venerated and most works follow examples set by well-established calligraphers, with the exception of secular or contemporary works. While most foreigners cannot interpret the Arabic letters, they can appreciate the formal beauty of the Islamic calligraphy [2].

Arabic calligraphy is one of three main features of Muslim art. In addition to calligraphy, Muslim art routinely includes intricate geometric patterns and a variety of vegetal motifs (arabesque) [3]. Arabic Calligraphy is applied to a wide range of decorative media other than paper, such as tiles, containers, carpets, murals, and coins. Arabic calligraphy is therefore an infinite source of creativity and inspiration [4]. This study attempts to use the Arabic script as a form of furniture, instead of just for decoration, and to introduce Arabic calligraphy into contemporary furniture design. The resulting furniture must also support human activities and be sustainable.

This research is mainly interested in new guidelines for a special style of flexible, sustainable furniture.

1.1. Research objectives

This study investigates the relation between Arabic script and furniture design, as well as their common characteristics, and the possibility of adapting those uniquely similar qualities to the furniture design requirements.

1.2. Methodology

A literature review identifies and classifies the various methods of using Arabic calligraphy in furniture design and sustainable Issues and solutions in furniture design and manufacturing. Experimental 3D modeling software is used to simulate the possibility of adapting Arabic calligraphy to flexible, sustainable furniture.
2.1. As ornaments and decoration for pieces of furniture

Figure 1 shows the use of different kinds of Arabic script to create an especial style of furniture in different eras. The Kufic style of calligraphy, with its ratios and proportions to write quotes from the Quran, is used to create pieces of furniture, such as bookcase stand or CD racks, reflecting culture and technology.[5].

2. Arabic script in furniture design

This section reviews the different methods of using characters in the design of furniture and décor. The different styles of Arabic writing mostly derive from early versions of the Qur'an. There are geometric styles, such as Kufic, and cursive (flowing) styles, such as Naskh, Thuluth, and Muhaqqaq. Numerous types of calligraphy and arts account for a large part of our architectural heritage. Different styles of Arabic calligraphy are used in various methods, categorized as follows.

Antique wooden carved cupboard in Arabian style with mother of pearl inlays, Arabic calligraphy pattern and arabesque window decorations. ca. 1910.

Casket, brass with inlaid gold, Arabic calligraphy pattern and silver, 1300-1350

A walnut carved and mother-of-pearl inlaid side table. late 19th Century

Hardwood teak chest, carved on top and three sides with Arabic writing and the word "Allah", mid to late 19th Century

Detail from wooden panel with Arabic inscription, 1150-1250

The use of Arabic script to decorate different pieces of furniture – modern art.

Figure 1: The use of different kinds of Arabic script to create an especial style of furniture in different eras. (https://www.behance.net/gallery/8379901/Optimistic-Bookshelf).
2.2. As a decoration for upholstery, curtains, and pillows

Arabic calligraphy is used as decorative print and embroidery on fabrics, decorative pillows, whether large as a basic motif or mixed with other geometric patterns, such as on a couch. A specially commissioned chair. God’s name with different floral patterns is stitched on the chair’s canvas upholstery (see Figure 2).

![Figure 2: Use of Arabic calligraphy as decorative print.](http://hebamagazine.com/design/calligraphic-furniture-by-raika/)

2.3. As 3D innovative forms of contemporary modern furniture

Even in the digital era, modern designers and calligraphers are still using Arabic calligraphy as an essential element of their designs. While many contemporary calligraphers and designers use the standard script styles mentioned above, others prefer a freestyle script unrestricted by the rules of any of the known standard scripts. This free style relies on the beauty of Arabic glyphs and how they can be curved, twisted, and reshaped to form harmonious and eye-catching artwork. Arabic calligraphy can be formed as various geometric shapes while maintaining the Arab character, even if recognized only from an elevated or side view of the object. Numerous types of calligraphy and arts account for a large part of Islamic heritage. The art of Arabic calligraphy should be respected and treated with great sensitivity. Individuals who work with Arabic calligraphy, whether in furniture design or in prints, should be highly devout and skilled. “Kashida's” designs are such as example: “Kashida” is the bridge between Arabic typography and modern lifestyle. It is the pioneer in fusing letterforms with functional products and furniture, executed with premium craftsmanship. “Kashida" creates art accessories and furniture. It excels in its designs and creativity and has an offbeat view of Middle Eastern culture (see Figure 3).
3. **Flexible sustainable furniture**

The main objective of this research is to explore the possibility of adapting Arabic calligraphy to the design of flexible, sustainable furniture. So that this part reviews the modern aspects of sustainable and flexible furniture.

Furniture is the major element in interior design. It uses a wide range of materials and colors. In the context of sustainability, the major criteria are the materials used in the production process and the furniture’s long-term use.

The main factors of sustainable furniture design are the consumer, furniture production, and design, especially among consumer communities that use traditional methods of implementation. The furniture’s manufacture and design ideas interfere as main factors [8], as shown in Figure 4.

Therefore, this experimental research is motivated by the consumer’s need for high-quality furniture design that satisfies the consumer’s desires and achieves a sustainable identity through Arabic calligraphy by interacting with it and experiencing it. In this study, the consumer plays the role of the manufacturer and is involved in the process of making his or her furniture.

3.1. **The goal of a sustainable furniture manufacture**

The goal is to create a system that can be supported indefinitely to protect the environment and be socially responsible for it. Sustainability is a solid trend today, growing to encompass and support sustainable design. Products are thus made in consideration of their environmental and social impacts during their full life cycle.

In addition to production process considerations, old furniture cannot be recycled. Such waste plays a large role in increasing the amount of global waste. Recycling is therefore one of the important aspects of sustainable furniture. Some furniture companies have recently started producing furniture entirely from waste products [9].
In recent years, there have been many innovative examples of furniture production. For example, at Cambridge University, the Design and Engineering departments developed a joint project to generate electricity from vegetation. Their system involved a light fixture on the table and plants inside the table (see Figure 5)\,[10\] with the lighting fixture obtaining its energy from the plants. A good example of innovative sustainable design, this project also encompasses the essence of interdisciplinary study in achieving sustainable environments.

3.2. Sustainability system

The system of sustainability proposed involves three basic principles: the consumer, a furniture construction system, and a design idea (see Figure 6)\,[11\] The factory makes a designed furniture product that the consumer then buys and tries to develop. The idea developed by the consumer may inspire the factory to proceed with a chain of further developments that involves the creative efforts of consumers.

Figure 6: The three basic principles of the sustainability proposed. (United Nations, 2008)

The theory of industrial ecology can be applied to the design and manufacture of furniture. When analyzing production and the use of furniture with the standard ecological life cycle model (Figure 7), sustainable furniture seldom has any severe ecological disadvantages: Raw materials, especially wood, are replenish able, there is a lively recycling market, and the disposal of materials is relatively simple because it is usually easy to disassemble furniture and the waste materials are not toxic. The existence of a trustworthy theory of ecology does not mean that it is always used. Designers and furniture manufacturers could often do better in minimizing the use of materials and energy and facilitating the recovery of materials\,[12\].

Figure 7: Ecological life cycle model. (Deniz Deniz, 2002)

3.3. Basic principles of environmental design

The following are some basic principles the environmentally aware designer should strive for:

- Increasing efficiency in the use of materials, energy, and other resources,
- Minimizing damage or pollution from the chosen materials,
- Reducing to a minimum any long-term harm to the environmental caused by the use of the product,
- Ensuring that the planned life of the product is the most appropriate in environmental terms and, if necessary, that the product functions efficiently for its full life,
- Taking full account of the effects of the product’s end disposal,
- Ensuring that the product’s packaging, instructions, and overall appearance are environmentally friendly,
- Encouraging the product’s efficient and environmentally friendly use,
- Minimizing nuisances such as noise and smell, and
- Analyzing and minimizing potential safety hazards.

3.4. Solutions for flexible, sustainable furnishings

Different needs can be adapted by using a single geometric unit as a versatile block that can be stacked to suit a wide range of functions, from shelves to partitions (see Figure 8), freestanding or wall mounted. The individual blocks can also double as boxes or stools. The units are made from materials that are non-toxic, free of volatile organic compounds, non-allergenic, and 100% recyclable\,[13\].
Flexible furniture can be used throughout all stages of life, from childhood to adulthood. The furniture design is based on the simple principles of the classic game Jenga\(^1\) Build's furniture can be constructed or its composition and height adjusted by adding or removing a modular furniture unit. A myriad of used sheets of paper that are recuperated, recycled, and reused in a completely new way for an extendible chair that can also be compact and multiform to host anywhere from one to 16 people! A group of good friends, a soccer team, or a school class (see Figure 9). The concept of expandable furniture is basically to reduce space when not in use \([14]\).

Cork furniture is flexible and ergonomic and made from recycled cork. It is as environmentally friendly as it is people friendly (see Figure 10). Cork is an engaging and environmentally responsible material that is completely sustainable, recyclable, and plentiful. In addition, because cork is 100% waterproof and impervious to rot and mold, these pieces functions outdoors as well as indoors \([15]\).

Foldable furniture is a highly desirable range of furniture that brings unique contemporary design to a practical, space-conscious world. As shown in Figure 11, the chair has two simple folds that allow it to evolve from a flat envelope to a chair. Foldable chairs have historically been an ugly space-saving device with no real aesthetic quality \([16]\).

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\(^1\) The word *jenga* in Swahili means to build
4. A vision for a special style of flexible sustainable furniture

4.1. Analysis of the selected script geometry

For this work, the researcher began with one character ِ (ط) that intrigued her and that, from her point of view, has a dynamic form; a combination of straight and curved lines, and an intriguing structure. The researcher was careful to maintain the simple beauty and graceful quality of the script. The characters were first broken down into parts, lines, profiles, and forms that could be rearranged to translate two-dimensional drawings into 3D forms.

As shown in Figure 12, ِ is a box with an alif, or long tooth, attached, and is the one character other than lām to be as tall. It originally had no tail at all and only acquired a short token one, much like mīm’s. Its twin, ز (ظ), is recognized by the one dot, which is always before the long tooth, over the body.

The long tooth does not have to be vertical, and is often slanted back at the same angle as the hook in dāl and kāf. This makes this character sometimes look exactly like a kāf, although close examination reveals it to be, instead, a closed box. There are even examples of the letter with a long tooth standing on the back of the box, rather than coinciding with its left side [17]. It turns out that the letter “ِ” has the aesthetics and proportions correspond with the golden ratio.

4.2. Using a single geometric unit in designing furniture
Furniture not only is a functional form but also serves as a medium that can link people to spaces and which can create an aesthetic experience for enriching human beings’ daily lives. The researcher attempted to use Arabic script to create future furniture design to ultimately enrich people’s experience and bring beauty to their lives. As shown in Figure 13, the researcher attempted to create images using the character Ṭā’ (ط).

Modular Build blocks can be stacked to create flexible shelving.

Flexible chair.

All kinds of furniture can “speak Arabic.”

Figure 13: Décor created by using the character Ṭā’ (ط).
4.3. Guidelines for a special style of flexible, sustainable furniture

There are several very important guidelines that must be adhered to when designing for a special style of flexible, sustainable furniture:

1. International, national, and third-party certification standards must be met.
2. Standards for resource reduction must be adopted, to
   - Design for reduced material content in products,
   - Establish minimum recycled content for raw materials,
   - Use manmade veneers, such as Tech wood, to reduce the percentage of wood waste,
   - Recycle all scrap metals, fabric, cardboard, and paper.
3. The furniture must be flexible and adaptable: Flexible and adaptable furniture that can change throughout the client’s day and over the longer term is required to accommodate the client-centered paradigm and advances in technology, as well as local identity.
4. Globalization versus local identity must be considered. The design should be global community centered while encompassing both local and global communities; that is, the furniture should enhance interaction capabilities within a diverse yet increasingly connected world, while incorporating local cultures.

5. Conclusion

Calligraphy is an important source of inspiration for interior designers attempting to integrate the art of calligraphy in the design of furniture and decorative accessories. The use of calligraphy continues to fit both classical tastes and the most daring contemporary modern designs.

This study combines both the beauty of the Arabic script and the researcher’s vision for furniture design. The furniture’s shape, either emphasized or simplified by necessity, is not just unique furniture but also 3D letters. Furthermore, the concepts introduced are solidly embedded into the functionality of the furniture. This allows ideas to be introduced to people, both physically and intellectually, to ultimately enrich their experience and bring beauty into their lives.

References


[7] [http://whatrhymeswithellen.com/2014/04/05/talk20-beirut-8th-edition/]


